

What is claimed is:

1. A thermal process station for thermally processing a workpiece, the station comprising:

5 an enclosed process chamber in which a heated platen is positioned, the heated platen having a face over which the workpiece is positioned during a thermal treatment; and

10 an additional enclosed chamber in which an additional heat source is positioned, the additional heat source being in thermally conductive contact with the process chamber.

2. The thermal process station of claim 1, further comprising a lid assembly comprising:

a first stage comprising the additional enclosed chamber; and

15 a second stage comprising at least a portion of an inlet plenum system through which a gas is supplied to the process chamber and at least a portion of an exhaust plenum system through which a gas is exhausted from the process chamber.

3. The thermal process station of claim 2, wherein at least one of the inlet and exhaust plenum systems comprises a plurality of radial flow channels.

4. The thermal process station of claim 3, wherein the inlet plenum system comprises a plurality of radial flow channels.

25 5. The thermal process station of claim 3, wherein the second stage is positioned between the first stage and the enclosed process chamber, and wherein the radial flow channels differ dimensionally from each other in a manner that enhances a uniformity characteristic of a transfer of thermal energy from the additional heat source to the enclosed process chamber.

30

6. The thermal process station of claim 1, further comprising a lid assembly comprising the additional enclosed chamber, wherein the additional heat source positioned in the additional enclosed chamber comprises a planar heating device, and wherein the additional enclosed chamber further comprises a headspace above a top surface of the planar heating device.

7. The thermal process station of claim 6, wherein the planar heating device is adjacent the floor of the additional enclosed chamber.

8. The thermal process station of claim 1, further comprising a lid assembly comprising:

an upper stage comprising the additional enclosed chamber, wherein the additional heating source is thermally coupled to a floor of the additional enclosed chamber; and

a lower stage comprising one or more walls that help to thermally couple the additional heating source to the enclosed process chamber.

9. The thermal process station of claim 1 further comprising a lid assembly, wherein the lid assembly comprises the additional enclosed chamber in which the additional heat source is positioned.

10. The thermal process station of claim 9, wherein the additional heat source is spaced apart from the enclosed process chamber.

11. The thermal process station of claim 10, wherein additional heat source is thermally coupled to the enclosed process chamber by a plurality of radial walls.

12. The thermal process station of claim 1, wherein a heating face of the additional heat source is opposed to heated platen face.

13. A thermal process station for thermally processing a workpiece, the station comprising:

a housing comprising a heated lid assembly and a bottom housing assembly that closably engages the heated lid assembly;

5 a process chamber inside the housing defined at least in part by the heated lid assembly and the bottom housing assembly;

a lid chamber inside the heated lid assembly;

a heat source having a heater face, the heat source being positioned inside the lid chamber in a manner such that the heater face is in thermal contact with the process chamber; and

10 a heated platen inside the process chamber on which the workpiece is supported during a thermal treatment.

14. The thermal process station of claim 13, wherein the heated lid assembly further comprises:

a first stage comprising the lid chamber; and

a second stage positioned between the first stage and the process chamber, the second stage comprising at least a portion of an inlet plenum system and at least a portion of an exhaust plenum system.

20

15. The thermal process station of claim 13, wherein the heated lid assembly further comprises:

an upper stage comprising the lid chamber, wherein the heat source positioned in the lid chamber is thermally coupled to a floor of the lid chamber; and

25 a lower stage comprising one or more walls that help to thermally couple the upper stage to the process chamber.

16. The thermal process station of claim 13, wherein the heat source is spaced apart from the process chamber.

30

17. The thermal process station of claim 16, wherein the heat source is thermally coupled to the process chamber by a plurality of radial walls.

5 18. A thermal process station for thermally processing a workpiece, the station comprising:

a heated lid assembly overlying a bottom housing assembly;

a processing chamber defined at least in part by the bottom housing assembly;

10 at least a portion of an inlet plenum system in the heated lid assembly comprising a gas flow path in fluid communication with the processing chamber; and

15 at least a portion of an exhaust plenum system in the heated lid assembly comprising a gas flow path in fluid communication with the process chamber, wherein at least one of the inlet and exhaust plenum systems comprises a plurality of radial flow channels.

19. The thermal process station of claim 18, wherein the radial flow channels differ dimensionally from each other in a manner that enhances a uniformity characteristic of a transfer of thermal energy from the heated lid assembly to the process chamber.

20. The thermal process station of claim 18, wherein the heated lid assembly further comprises:

25 a lid chamber comprising;
a heat source positioned in the lid chamber; and
a headspace above a top surface of the heat source.

21. A method of improving the thermal uniformity of a workpiece during a thermal treatment, comprising the steps of:

30 providing a first heat source having a first heating face;

providing a second heat source having a second heating face, wherein the first and second heating faces are opposed to each other; and

positioning the workpiece between the first and second, opposed heating faces during at least a portion of the thermal treatment.

5

22. The method of claim 21, wherein at least part of the space between the first and second heat source define a process chamber and further comprising the step of, prior to the step of positioning the workpiece, providing an inlet plenum system comprising a gas flow path in fluid communication with the process chamber and an exhaust plenum system comprising a gas flow path in fluid communication with the process chamber.

10

23. The method of claim 22, wherein at least one of the inlet and exhaust plenum systems comprises a plurality of radial flow channels.

15